

CAN WE SAVE THE MALEO?

TEXT AND PHOTOS BY KEVIN SCHAFER

Found only on the Indonesian island of Sulawesi, this spectacular megapode may face imminent extinction—because people like to eat its eggs



Just east of Borneo, the island of Sulawesi is a curious sort of place. First, there is its striking profile; on a map, Sulawesi's sprawling limbs make it look like a wild, dancing monkey. Then there are the strange and unexpected animals found there, including two species of dwarf buffalo called anoas, a host of unusual primates, and perhaps best of all, the babirusa—a weird, tusked pig. Sulawesi also has the distinction of having the highest ratio of endemic bird species of any island in the world. Nearly a third of its 400 species of birds are found nowhere else and include a staggering 12 endemic genera.

If you had to choose a flagship bird for Sulawesi, it would almost certainly be the Maleo. Large, terrestrial, and resembling a leggy chicken, adult Maleos stand two feet tall and are mostly black and white. They also have some unexpected bits of bling: a delicate rosy flush on their breast feathers, a jaunty wrenlike tail, and best of all, an odd, knobby crest like an elongated helmet, with a function that's unclear.

Maleos are megapodes (which translates as “big feet”), gallinaceous cousins of the curassows, and more distantly, of pheasants

and turkeys. The 19 species of megapodes, restricted to Australasia and nearby islands, share a unique reproductive strategy. Instead of building conventional nests, they simply bury their eggs and walk away, leaving the task of incubation to nature. Some megapodes build enormous mounds of leaves, which produce the required heat through decomposition. But Maleos, for their part, lay their eggs in warm volcanic soil or in open patches of coastal sand, heated by the tropical sun.

Found nowhere else in the world, Maleos are living masterpieces of adaptation, at once both strikingly beautiful and slightly odd. Sadly, they are also in danger of disappearing forever. Once considered common on much of Sulawesi, their population has plummeted by 90 percent since 1950. A 2000 census suggested that only 4,000 to 7,000 breeding pairs remain in the wild. In the years since, little has been done to slow their decline.

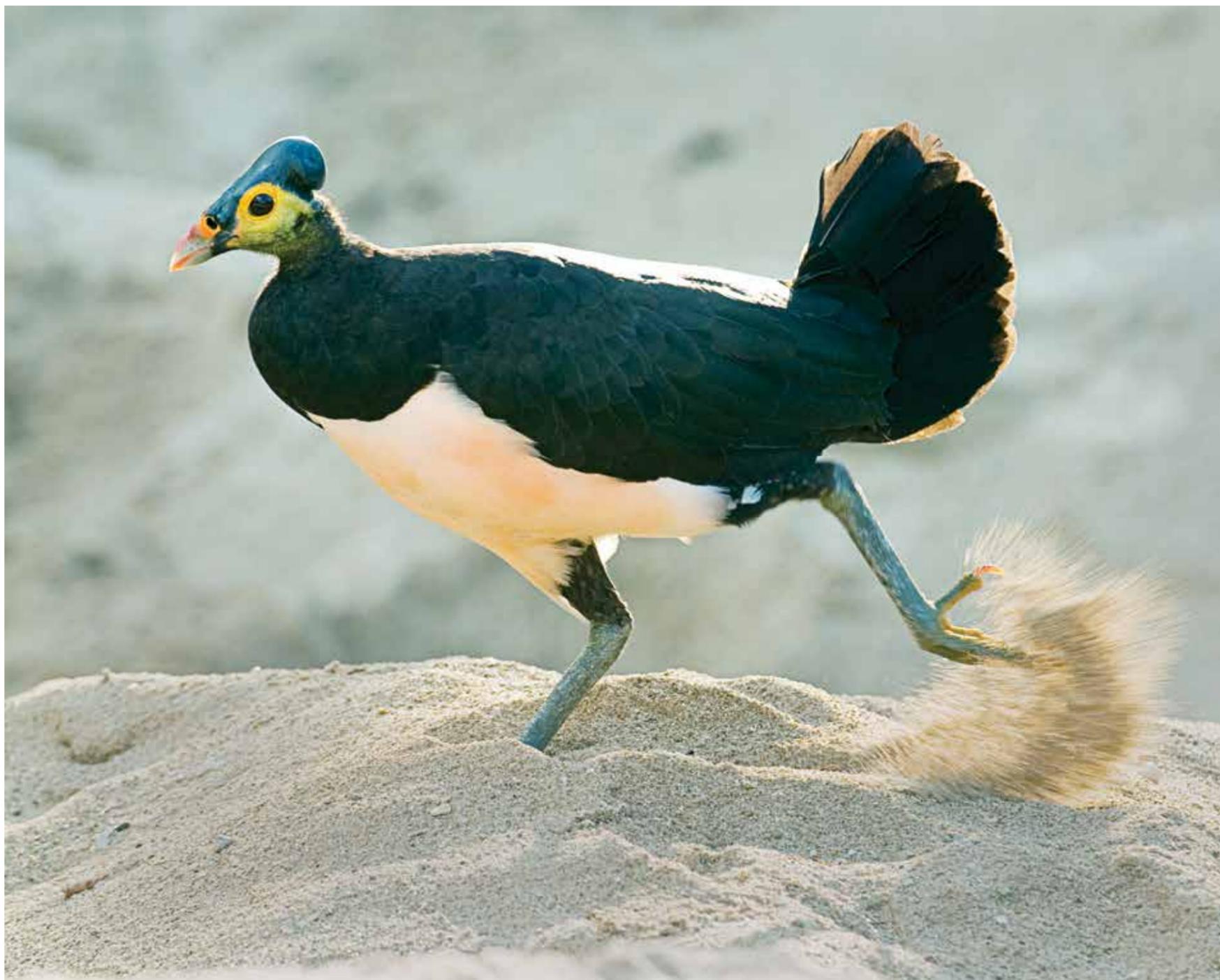
I recently spent a week with Maleos on Sulawesi as part of a team of photographers invited to document the biodiversity of this remarkable island. Our host was Marcy Summers, executive director of the Alliance for Tompotika Conservation (AITo), established in 2006 to protect Maleos on the remote Tompotika Peninsula, Sulawesi's east-central limb.

My days began before sunrise as I crawled into my cramped, camouflaged blind directly alongside the nesting ground. The sand-filled clearing in the forest, about half the size of a baseball diamond and only a few dozen yards from a largely pristine beach, was still quiet and empty at that hour. It was not obvious to me what made this specific patch of sand ideal, but clearly it was, for almost as soon as the sun rose above the trees, pairs of Maleos began emerging from the surrounding forest.

They moved cautiously at first, as if nervous to be the first birds out in the open, but they did not come quietly. Although Maleos are thought to be largely silent away from the nesting ground, these birds were unabashedly noisy, announcing their arrival with a series of weird, rattling calls that sounded a bit like geese honking—while gargling at the same time. Within an hour, 20 or more pairs were spread out across the sand, where they wandered back and forth until they found a spot they liked. Their nest location decided, both birds immediately began digging.

Maleos are not timid excavators; they are earth-moving machines. With their large, partially webbed feet, they scoop sand in

As Maleos steadily dig, they drop lower and lower below the surface, until they find sand at an ideal temperature for incubating their single egg. Once the egg is laid, it is abandoned by the adults. The warm sand incubates the egg until it hatches and the precocial chick emerges.



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an automatonlike trance. Clearly, it's what they were born to do, and before long, all of them were doing it; by midmorning, I could look across the nesting ground and see a dozen or more plumes of sand being thrown into the air at any given moment.

Each toss seems to shift only a small amount of sand, but progress is steady as the birds slowly, almost imperceptibly, sink lower. Eventually, the female Maleo disappears entirely from view, laying her single egg at the bottom of the massive pit, three feet or more

deep, where presumably the temperature is perfect for incubation.

The male, meanwhile, stays near the top, doing the occasional cursory digging, but mostly concentrating on his job of keeping other Maleos away. The relative peace of the nesting ground was regularly interrupted by angry males chasing each other across the sand, the defender puffing himself up and sporting a malevolent stare to make himself more threatening to intruders. These confrontations rarely went beyond bluff charges and noisy warnings,

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but occasionally real fights do break out and feathers fly. The fact is, for birds drawn by necessity to these communal nesting areas, Maleos don't seem to like one another very much.

Once the egg is laid, both birds immediately begin shoveling sand back into the hole with the same enthusiasm they had shown in digging it. The entire process of digging and refilling the nest hole may take less than one hour or as many as three, but the process can be interrupted or even entirely aborted by the sight of a hawk flying overhead, or any sudden, unexpected noise. At those times, the birds scurry into the nearby forest or fly up to the safety of the canopy, returning only reluctantly.

Regular visitors to the nesting grounds also included several monitor lizards, some up to four feet long. These dinosaurlike reptiles prowl the sand, looking for Maleo eggs, especially those from existing nests unearthed by the digging of later Maleo pairs. Surprisingly, the birds seem to pay little attention to these marauding predators, which often wandered right through all the flying sand. (Other megapode species, in contrast, have been known to use their digging skills to drive off unwanted monitor lizards with a barrage of sticks and stones.)

Buried under the hot sand, a Maleo egg may take 60 to 80 days to develop, the precise time depending on the varying temperatures in the nest chamber. Once it hatches, the Maleo chick must

dig its way out of the sand, emerging at night, fully feathered and already capable of flight. Often the first thing these newborns do is fly into a tree—even though they've never seen one before.

What the future holds for these young Maleos is uncertain. The challenges confronting the species are not mysterious. Sulawesi's annual deforestation rate was 2.5 percent from 1985 to 1997, but it is probably much higher now as population and development on the island both expand. Native forests on Sulawesi are disappearing, just as they are throughout Indonesia, either incrementally, through small-scale agriculture, or en masse, to make room for palm-oil plantations and mining projects.

The most immediate threat to Maleos, however, is the collecting of their eggs for food. This in itself is not entirely surprising, because their half-pound egg is a big chunk of protein in a tidy, convenient package. What's more, each egg is comprised of 60 to 70 percent yolk, a higher ratio than in any other bird. This is almost certainly an adaptation for producing that super-precocial Maleo chick.

Harvesting Maleo eggs has a long history on Sulawesi. In 1859, when Alfred Russel Wallace visited the island (then called Celebes), he made an ominous observation about Maleo eggs: "When quite fresh they are delicious eating, as delicate as a fowl's egg, but much richer, and the natives come from more than fifty miles round to search for them."

Since Wallace's day, however, much has changed. The eggs are still prized but have become a luxury item for sale in the city, not a source of subsistence. "They are like caviar," says Marcy Summers of AITO, "a high-status gift or souvenir for the wealthy." The fact is, the Maleo eggs being taken are not being used to feed hungry people in the countryside but are sold for very little to middlemen who make big profits from the trade. Although Maleos are protected and collecting their eggs has been illegal since 1972, the laws are almost never enforced.

"When we started here in 2006," she says, "there was a highly organized village system to divvy up the privilege of digging eggs; each day it was a different couple of guys allowed to do it."

On one of her first visits to a Maleo nesting ground, Summers had a chance to speak casually with some of



the egg collectors attending the site. She remembers asking them if there were a lot of birds using the area. "Well, no, not so many anymore," they told her. "The sand here used to be black with Maleos!" Then she asked if they ever intentionally left eggs behind to guarantee a continued harvest. "Why would we do that?" the men answered. "If we left them, someone else would just dig them up."

Shortly after this exchange, Summers was asked to give a presentation on the wildlife of Sulawesi to the nearby village of Taima. "During my talk I asked them if they'd thought about what would happen if they continued to take every egg like they did now? Their answer was no, they really hadn't thought about it. At that point, I suggested that if they keep taking every egg, they're going to lose the birds here, just as they have everywhere else.

"Like the Bald Eagle in the United States, everybody in Su-

At left and above, male Maleos assume an aggressive pose, puffing up their chests to threaten other intruding males. These confrontations are usually just bluffs, but occasionally real fights break out and feathers fly.

lawesi knows about the Maleo and knows that it's a special bird for them," said Summers. "Few have ever seen one, and most don't know that they're endangered, but when they find that out they almost universally think the Maleo should be saved.

"When I was done with my talk in Taima, a number of people came up to me and said, 'No, that isn't what we want, we don't want to lose them. Can you help us?' Well, you can't say no to something like that!"

In the beginning, Summers—who had worked in Indonesia for many years with The Nature Conservancy—suggested a

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gradual approach, proposing that they simply try to set aside one day of the week when no eggs would be collected. At the very least, she reasoned, this would allow a significant number of eggs to survive until hatching. As compensation, she offered to pay the villagers a fee, both to help guard the nesting ground and to make up for the loss of revenue from egg sales. But when she presented that idea to the village, she was stunned; they responded by suggesting that collecting eggs stop entirely.

“It turned out they thought that the money would be better,” Summers explains. “And it’s true: the wages they earn from guarding the nesting grounds are more than they could hope to get from even the maximum number of eggs they had been taking.”

Summers was delighted—and relieved. “Indonesian law says you can’t take Maleo eggs. We would technically have been in

violation of the law if we had allowed the egg collecting to continue. In the end, this was a much cleaner solution—and it was their choice. We did a six-month trial period, and no one ever looked back. To be honest, there’s never been any suggestion that they go back to egg collecting.”

Eventually, AITo stopped paying direct compensation for the loss of eggs, preferring to help the village by providing other services, including a much-needed water project. With the support of the village, AITo fenced off the nesting ground and built a guard station at the entrance. They hired villagers—in some cases the same men who had been egg collectors in the past—and, together with their own staff, began protecting the birds.

To no one’s surprise, the number of Maleos using the area has rebounded. “Since the moratorium began in 2006, we’ve protected thousands of eggs—the exact number is not known,” says Summers. “What’s more, chicks are hatching naturally, and the number of adult Maleos returning to this nesting ground is up 62 percent. Some days it even gets crowded out there on the nesting ground—a great problem to have!”

The success at Taima has reinforced one of Summers’s firm beliefs—that success at protecting species like the Maleo requires local, community-based involvement. But an islandwide, coordinated approach is also needed. “One of my dreams is that someday we’ll get half-a-million dollars to create an islandwide awareness campaign and dry up the market for Maleo eggs entirely in the cities,” says Summers. “We’d like to see it become *uncool* to buy and eat Maleo eggs!”

Elsewhere on Sulawesi, conservation efforts have met with less success. According to John Tasirin, chairman of the Indonesian Biodiversity Conservation Laboratory, “There may be as many as 90 nesting grounds throughout the island that were once known to be active, but the massive majority of them have been abandoned. The rest are critically threatened.” Most

historic nesting grounds, lacking protection, have been stripped of eggs for so long that Maleos no longer use them, or do so only in small and dwindling numbers.

In addition to protecting existing nesting areas, a parallel effort in recent years has been to establish Maleo hatcheries where eggs



can be protected and chicks released to bolster wild populations. In most hatcheries, Maleo eggs are removed from a nearby nesting ground and reburied in a protected enclosure. The eggs are incubated and the chicks released, in the hope that this will bolster the dwindling population.

Unfortunately, although thousands of Maleo chicks have been released from such hatcheries over the years, the populations of breeding adults in those areas do not seem to have significantly increased. This suggests that the hatchery model may not be as effective in slowing the Maleo’s decline as researchers had hoped.

“A hatchery program is just the low-hanging fruit,” says Marc Argeloo, a Dutch expert on Indonesian natural history who has written extensively on Maleos. “If these become some sort of stand-alone approach, it will do very little to help the species in the wild.” According to Argeloo, no long-term conservation strategy will be effective without tackling habitat protection. Simply said, all those chicks being released need somewhere to live.

“We clearly need to protect forest corridors,” Summers agrees. Maleos spend most of their time in deep upland forest, and often travel considerable distances to reach the nesting grounds near the coast or in areas of geothermal activity. Setting priorities for habitat protection, however, will require knowing how Maleos move and what kinds of environments they favor at different stages in

their life cycle. Much of this information is still largely unknown.

“Unfortunately, we can’t answer many of the most basic biological and ecological questions about the Maleo,” says Summers. “To inform our conservation efforts, we need to know such things as how many eggs each female lays per year, what are the natural hatching rates in the wild, and how far Maleos travel between nonbreeding and nesting grounds.” Summers plans to begin a long-term research project to answer some of these basic questions, while still managing AITo’s protection work.

In addition, AITo recently launched a systematic search for previously unknown Maleo nesting areas, which is already bearing fruit—a new nesting site on the coast was recently found.

Clearly, ensuring the survival of Maleos will require efforts on multiple fronts: protecting nesting grounds, establishing and maintaining viable migratory corridors, and protecting large tracts of native forest that Maleos require. Even hatcheries may have a role to play, says Summers.

In the end, saving the Maleo will depend on the people of Sulawesi and their commitment to protecting their very own unique and spectacular bird. ◆

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A newly emerged Maleo chick (above) sits in tree right after its first flight. On the facing page, a monitor lizard patrols the nesting grounds, looking for eggs kicked up by digging Maleos. The Maleos pay surprisingly little attention to these predatory reptiles and don’t seem to make any attempt to chase them from the nesting area.